



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09 864,698

05 23 2001

David J. Corisis

3070.2US (96 1079.2)

1726

24247

7590

05 09 2003

TRASK BRITT

P.O. BOX 2550

SALT LAKE CITY, UT 84110

EXAMINER

GRAYBILL, DAVID E

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 05.09.2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/864,698

Applicant(s)

CORISIS ET AL.

Examiner

David E Graybill

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18-26 is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

In the rejections infra, reference labels are generally recited only for the first recitation of identical claim language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6, 9 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee (5089878) and Farnworth (5012323).

At column 2, lines 1-47, column 3, line 1 to column 4, line 51, and column 6, lines 37-66, Lee teaches the following:  
A semiconductor die assembly comprising: a semiconductor die 2 having a plurality of bond pads on an active surface thereof; a lead frame 8 having at least a first group of lead fingers 12 and a second group of lead fingers 12 to respectively extend from first and second opposing sides of said semiconductor die attached to a die-attach location 10 on said lead frame to another side of said lead frame in a substantially mutually parallel configuration [at least at outer ends of lead fingers 12]; a first voltage reference plane 18b adjacent to said first side of said semiconductor die, said first voltage reference plane underlying at least a portion of said first group of lead fingers extending from said first side of said semiconductor die toward said another side of said lead frame; and a second voltage reference plane 18b adjacent to said second opposing side of said semiconductor die, said second voltage reference plane underlying at least a portion of said second group of lead fingers extending from said second opposing side of said semiconductor die toward said another side of said lead frame,

wherein said first voltage reference plane and said second voltage reference plane are adhered to at least some of the lead fingers of said first group of lead fingers and said second group of lead fingers, respectively, wherein said first voltage reference plane and said second voltage reference plane are adhered directly via a non-conductive adhesive 36 to said at least some of the lead fingers of said first group of lead fingers and said second group of lead fingers, respectively, further comprising a packaging material 34 encapsulating at least said active surface of said semiconductor die, wherein said packaging material at least partially covers said first and said second voltage reference planes and said first and said second groups of lead fingers, wherein said first voltage reference plane and said second voltage reference plane are electrically connected to at least one lead finger of said first group of lead fingers and said second group of lead fingers, respectively, which in turn is connected through a bond pad to a reference potential of said semiconductor die, wherein said first voltage reference plane and said second voltage reference plane are of sufficient mass to measurably alter heat transfer characteristics of said assembly, further comprising a packaging material encapsulating said assembly so that only outer ends of said at least said first group of lead fingers and said second

group of lead fingers extend therethrough, wherein said first voltage reference plane and said second voltage reference plane extend over at least about fifty percent of a surface area of said at least said first group of lead fingers and said second group of lead fingers, respectively, wherein said first voltage reference plane and said second voltage reference are separated from said at least said first group of lead fingers and said second group of lead fingers, respectively, by an insulating adhesive structure, wherein said insulating adhesive structure comprises an insulating film 36 having an adhesive on opposing surfaces thereof, one surface of said opposing surfaces being adhered to at least one of said first group of lead fingers and said second group of lead fingers and another surface of said opposing surfaces being adhered to at least one of said first voltage reference plane and said second voltage reference plane.

To further clarify the teaching of the reference planes underlying the groups of lead fingers, the disclosed product of Lee is not limited to an absolute frame of reference or otherwise limited to a particular orientation, and it is inherent that there is a frame of reference wherein the planes are underlying the groups of lead fingers.

To further clarify the teaching wherein said first voltage reference plane and said second voltage reference plane are of

sufficient mass to measurably alter heat transfer characteristics of said assembly, it is noted that this is an inherent property of the planes.

However, Lee does not appear to explicitly teach the first group of lead fingers and the second group of lead fingers respectively extend to another, single side of the lead frame.

Nonetheless, at column 2, line 52 to column 4, line 15, Farnworth teaches a first group of lead fingers 23 BRO and a second group of lead fingers 23 BLO to respectively extend from first and second opposing sides of a semiconductor die 41 attached to a die-attach location on a lead frame to another, single side of the lead frame in a substantially mutually parallel configuration. Furthermore, it would have been obvious to combine the products of Lee and Farnworth because, as cited, Lee teaches that, "The method provides for the fabrication of a low impedance package using a conventional lead frame," "the invention could readily be applied to any one of a variety of lead frame configurations," "the organization of the various leads will vary among packages. Many other arrangements will be apparent," and, "[the invention] uses presently available lead frames"; and the combination would provide a low impedance package using the conventional lead frame of Farnworth.

Also, Lee does not appear to explicitly teach wherein said lead frame comprises a vertical surface mount package configuration.

Nevertheless, as cited, Farnworth teaches wherein all of the lead fingers of the lead frame are configured to exit the package for external connection along a single side or edge of the package - as applicant defines the term *vertical surface mount package configuration* at specification page 8, lines 18-22 - therefore, Farnworth teaches wherein a lead frame comprises a vertical surface mount package configuration. Moreover, it would have been obvious to combine the product of Farnworth with the product of Lee for the same reasons recited supra.

Claims 1-9 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee (5089878) and Brooks (5150194).

Lee is applied to the rejection for the same reason it was applied to claims 1-6, 9 and 13-17 supra. In addition, Lee teaches wherein said lead frame includes a die-attach paddle 10 to which said semiconductor die is attached, and wherein said die-attach location comprises a die-attach paddle.

However, Lee does not appear to explicitly teach the first group of lead fingers and the second group of lead fingers respectively extend to another, single side of the lead frame.



Nonetheless, at column 4, lines 1-19, Brooks teaches a first group of lead fingers 15 and a second group of lead fingers 15 to respectively extend from first and second opposing sides of a semiconductor die (not labeled) attached to a die-attach location 11 on a lead frame to another, single side of the lead frame in a substantially mutually parallel configuration. Furthermore, it would have been obvious to combine the products of Lee and Brooks because, as cited, Lee teaches that, "The method provides for the fabrication of a low impedance package using a conventional lead frame," "the invention could readily be applied to any one of a variety of lead frame configurations," "the organization of the various leads will vary among packages. Many other arrangements will be apparent," and, "[the invention] uses presently available lead frames"; and the combination would provide a low impedance package using the conventional lead frame of Brooks.

Also, Lee does not appear to explicitly teach wherein said lead frame comprises a vertical surface mount package configuration.

Nevertheless, as cited, Brooks teaches wherein all of the lead fingers of the lead frame are configured to exit the package for external connection along a single side or edge of the package - as applicant defines the term *vertical surface*

*mount package configuration* at specification page 8, lines 18-22 - therefore, Brooks teaches wherein a lead frame comprises a vertical surface mount package configuration. Moreover, it would have been obvious to combine the product of Brooks with the product of Lee for the same reasons recited *supra*.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee and Farnworth as applied to claims 1-6, 9 and 13-17, *supra*, and further in combination with Higgins (5583377).

As cited, in the combination, Lee teaches a packaging material 34 extending over at least one of said first voltage reference plane and said second voltage reference plane.

However, the combination of Lee and Farnworth does not appear to explicitly teach wherein at least one of said first voltage reference plane and said second voltage reference plane includes a plurality of projections extending outwardly away from a surface of said at least one of said first voltage reference plane and said second voltage reference plane, wherein said projections extend through said packaging material, and wherein said projections extend through said packaging material to an exterior surface thereof.

Nonetheless, at column 5, lines 32-42, and column 9, lines 2-9, Higgins teaches packaging material 42, 54 extending over a

voltage reference plane 46, wherein the voltage reference plane includes a plurality of projections 48, 50, 56 extending outwardly away from a surface of the voltage reference plane, wherein the projections extend through the packaging material to an exterior surface thereof. In addition, it would have been obvious to combine the product of Higgins with the product of the combination of Lee and Farnworth because it would facilitate heat dissipation.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee and Brooks as applied to claims 1-9 and 13-17, and further in combination with Higgins (5583377).

As cited, in the combination, Lee teaches a packaging material 34 extending over at least one of said first voltage reference plane and said second voltage reference plane.

However, the combination of Lee and Brooks does not appear to explicitly teach wherein at least one of said first voltage reference plane and said second voltage reference plane includes a plurality of projections extending outwardly away from a surface of said at least one of said first voltage reference plane and said second voltage reference plane, wherein said projections extend through said packaging material, and wherein

said projections extend through said packaging material to an exterior surface thereof.

Nonetheless, at column 5, lines 32-42, and column 9, lines 2-9, Higgins teaches packaging material 42, 54 extending over a voltage reference plane 46, wherein the voltage reference plane includes a plurality of projections 48, 50, 56 extending outwardly away from a surface of the voltage reference plane, wherein the projections extend through the packaging material to an exterior surface thereof. In addition, it would have been obvious to combine the product of Higgins with the product of the combination of Lee and Brooks because it would facilitate heat dissipation.

Claims 18-26 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach the invention of claims 18-26 as a whole including an intervening neck extending across said another, single side of said lead frame and conductively connecting said first voltage reference plane and said second voltage reference plane.

Applicant's amendment and remarks filed 1-21-3 have been fully considered, are addressed in the rejection supra, and are further addressed infra.

Applicant argues that there is no motivation to combine Higgins with Lee and Farnworth. This argument is respectfully traversed because motivation is explicitly and clearly provided; specifically, "it would have been obvious to combine the product of Higgins with the product of the combination of Lee and Farnworth because it would facilitate heat dissipation."

Also, applicant appears to contend that Higgins and Lee are non-analogous art. To this end, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if it is not, then it must be reasonably pertinent to the particular problem with which applicant was concerned in order to be relied upon as a basis for rejection of the claimed invention. In re Oetiker, 977 F.2d 1443, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). In this case, both Higgins and Lee are in the field of applicant's endeavor, namely, "integrated circuit packages employing voltage reference planes (specification, page 2, lines 8-9)."

Relatedly, applicant asserts, "Due to the significant structural and functional differences between the heat sink 48 of Higgins et al. and the coupons 18a and 18b of Lee, it would not be obvious to combine the two to achieve the structural features recited in claims 10, 11 and 12." This assertion is respectfully deemed to be unpersuasive because it is a vague and

general statement in broad terms unsupported by proof or a showing of facts; hence, it essentially amounts to mere conjecture. Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989) (statement in publication dismissing the "preliminary identification of a human b - NGF - like molecule" in the prior art, even if considered to be an expert opinion, was inadequate to overcome the rejection based on that prior art because there was no factual evidence supporting the statement); In re Beattie, 974 F.2d 1309, 24 USPQ2d 1040 (Fed. Cir. 1992) (declarations of seven persons skilled in the art offering opinion evidence praising the merits of the claimed invention were found to have little value because of a lack of factual support); Ex parte George, 21 USPQ2d 1058 (Bd. Pat. App. & Inter. 1991) (conclusory statements that results were "unexpected," unsupported by objective factual evidence, were considered but were not found to be of substantial evidentiary value).

Applicant also argues that the conclusion of obviousness is based upon improper hindsight reasoning. Indeed, it has been recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning; yet, so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed

Application/Control Number: 09/864,698  
Art Unit: 2827

Page 14

invention was conceived, and so long as it does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper. In re McLaughlin, 443 F.2d 1392; 170 USPQ 209 (CCPA 1971). To this end, it is respectfully submitted that these criteria are satisfied in the rejection of the instant invention.

As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

***Any telephone inquiry of a general nature or relating to the status (MPEP 203.08) of this application or proceeding should be directed to Group 2800 Customer Service whose telephone number is 703-308-1782306-3329.***

Any telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (703) 308-2947. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is 703/308-7722.

*David E. Graybill*

David E. Graybill  
Primary Examiner  
Art Unit 2827

D.G.  
8-May-03